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EXAMINER	
PHAM, HUNG Q	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/825,013	Applicant(s) MORIMOTO ET AL.	
	Examiner HUNG Q. PHAM	Art Unit 2162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 January 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 15-23* is/are rejected.

7)☒ Claim(s) *14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

- Applicants filed an Appeal Brief on 06/27/2003. The conferees agreed with the applicants that the cited references do not teach or suggest the elements of independents claims 11, 12 and 15, which are directed to a method and apparatus for calculating an optimal distance, especially the claimed feature: ***a data table*** as in claim 11 and ***an intermediate table*** as in claims 12 and 15. In addition, the claimed invention is under rejections of U.S.C § 101 and 112, and these rejections have not been addressed in the previous actions. Therefore, the finality of the office action 01/27/2003 has been withdrawn. The Office regrets and apologizes for any inconvenience.

- In view of the Appeal Brief filed on 01/24/2005, PROSECUTION IS HEREBY REOPENED. The rejections are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

On 05/02/2005, examiner had an interview with one of applicants' representative, Anne Dougherty, for a Supplemental Brief as indicated in the Interview Summary. However, there has been no response.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-11 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

- As set forth in MPEP 2106 (II) (A):

The claimed invention as a whole must accomplish a practical application. That is, it must produce a "useful, concrete and tangible result." State Street, 149 F.3d at 1373, 47 USPQ2d at 1601-02. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "real world" value, as opposed to subject matter that represents nothing more than an idea or concept, or is simply a starting point for future investigation or research (Brenner v. Manson, 383 U.S. 519, 528-36, 148 USPQ 689, 693-96); In re Ziegler, 992, F.2d 1197, 1200-03, 26 USPQ2d 1600, 1603-06 (Fed. Cir. 1993)). Accordingly, a complete disclosure should contain some indication of the practical application for the claimed invention, i.e., why the applicant believes the claimed invention is useful.

Regarding claims 1-11, especially claims 1, 6 and 11, the claimed method can be implemented with a pencil, and a piece of paper. Further, the language of claim 1 raises a question as to whether the claimed method is directed merely to an abstract idea that is not tied to a technological art, environment, or machine which would result in a practical application producing a concrete, useful, and tangible result to form the basis of statutory subject matter under 35 U.S.C. § 101. Therefore, the claimed invention is non-statutory subject matter. The claim should be amended to indicate the claimed subject matter is implemented by a computer, i.e., a computer implemented method.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8, 12, 13, 15 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 recites the limitation *the value of said orientation used to optimize said objective function*. There is insufficient antecedent basis for this limitation in the claim.

Claims 12 and 15 recite the limitation *the value of said objective function that is entered by said input means*. There is insufficient antecedent basis for this limitation in the claim.

As in claims 13 and 16, *optimization function* is *selected from among objective functions to be examined*. However, only one objective function was inputted as claimed at claim 12. Thus, the claim is indefinite because there will be no optimization function for selecting.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 5-10, 17, 20, 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roussopoulos et al. [Nearest Neighbor Queries] in view of Koperski et al. [Spatial Data Mining: Progress and Challenges] and Frank

[MAPQUERY: Data Base Query Language for Retrieval of Geometric Data and their Graphical Representation].

Regarding claims 1 and 20, Roussopoulos teaches a spatial data mining comprising the step of:

providing from said database a starting point or a starting point group (as illustrated by Roussopoulos at the INTRODUCTION section, an object from the database on the screen is a starting point for querying five nearest objects);

defining an objective function that is examined (the query as discussed above indicates an objective function that is examined); and

calculating a distance or an orientation block originating at said starting point or said starting point group in order to optimize said objective function that is defined (as illustrated at EXPERIMENTAL RESULTS section, objectDIST is defined in the RECURSIVE PROCEDURE to calculate a distance originating at the provided object in order to optimize the query).

Roussopoulos does not explicitly teach the purpose of the query is to ***introduce said spatial rules*** and ***address*** is included in spatial information. Koperski teaches the technique of ***introducing spatial ruled*** by examining an objective function (Koperski, ALGORITHM FOR MULTIPLE LEVEL SPATIAL ASSOCIATION RULES), and Frank teaches spatial information includes ***address*** (Frank, 6.2 WINDOW).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to use the Roussopoulos query for introducing spatial rules and

include address in spatial information in order to discover interesting knowledge from spatial data.

Regarding claim 2, Roussopoulos, Koperski and Frank, in combination, teach all of the claimed subject matter as discussed above with respect to claim 1, Roussopoulos further discloses ***objective function is a function for which a distance or an orientation requested by an analyzation business is not provided*** (the query as disclosed by Roussopoulos at INTRODUCTION section is defined by a user and not provided by the system).

Regarding claim 3, Roussopoulos, Koperski and Frank, in combination, teach all of the claimed subject matter as discussed above with respect to claim 1, Koperski further discloses the step of ***entering as input parameters the definition of a distance, the definition of said starting point or said starting point group and the definition of said objective function*** (Roussopoulos, INTRODUCTION).

Regarding claim 5, Roussopoulos, Koperski and Frank, in combination, teach all of the claimed subject matter as discussed above with respect to claim 1, Koperski further discloses the step of ***displaying on a map said distance or said orientation block relative to said starting point or said starting point group*** (Koperski, FIG. 3-4).

Regarding claims 6, 21 and 23, Roussopoulos teaches a spatial data mining comprising the step of:

providing from said database a starting point or a starting point group; employing said starting point or said starting point group to define an orientation (as illustrated by Roussopoulos at the INTRODUCTION section, an object from the database on the screen is a starting point for querying five nearest objects, and the object is employed to define an orientation, e.g., East of a location);

defining an objective function that is examined (the query as discussed above indicates an objective function that is examined); and

calculating a distance or an orientation block originating at said starting point or said starting point group in order to optimize said objective function that is defined (as illustrated at EXPERIMENTAL RESULTS section, objectDIST is defined in the RECURSIVE PROCEDURE to calculate a distance originating at the provided object in order to optimize the query).

Roussopoulos does not explicitly teach the purpose of the query is to ***introduce said spatial rules*** and ***address*** is included in spatial information. Koperski teaches the technique of ***introducing spatial ruled*** by examining an objective function (Koperski, ALGORITHM FOR MULTIPLE LEVEL SPATIAL ASSOCIATION RULES), and Frank teaches spatial information includes ***address*** (Frank, 6.2 WINDOW).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to use the Roussopoulos query for introducing spatial rules and include address in spatial information in order to discover interesting knowledge from spatial data.

Regarding claim 7, Roussopoulos, Koperski and Frank, in combination, teach all of the claimed subject matter as discussed above with respect to claim 6, Koperski further discloses ***objective function is a function for which a distance or an orientation requested by an analyzation business is not provided*** (the query as disclosed by Roussopoulos at INTRODUCTION section is defined by a user and not provided by the system).

Regarding claim 8, Roussopoulos, Koperski and Frank, in combination, teach all of the claimed subject matter as discussed above with respect to claim 6, the orientation as disclosed by Roussopoulos, e.g., to the East of the location, implies an angle of Y_1 to Y_2 or ***the numerical value of said orientation*** from the location, and the orientation must be defined and initiated when query is process ***for obtaining an orientation block***, and ***used to optimize said objective function***.

Regarding claim 9, Roussopoulos, Koperski and Frank, in combination, teach all of the claimed subject matter as discussed above with respect to claim 6, the orientation as disclosed by Roussopoulos, e.g., to the East of the location, implies an angle of Y_1 to Y_2 or ***a search objective data range, at equal distances from*** the location as ***said starting point and from said starting point group, that is appropriate for calculating an orientation is selected as said orientation block***.

Regarding claim 10, Roussopoulos, Koperski and Frank, in combination, teach all of the claimed subject matter as discussed above with respect to claim 6, Koperski

further discloses the step of ***displaying on a map said distance or said orientation block relative to said starting point or said starting point group*** (Koperski, FIG. 3-4).

Regarding claim 17, Roussopoulos teaches a spatial data mining comprising the step of:

input means for the input of an objective function for which a distance or an orientation requested by an analyzation business is not provided (as illustrated by Roussopoulos at the INTRODUCTION section, a user interface is provided for inputting a request to find the five nearest objects to it in the database as ***input means for the input of an objective function for which a distance or an orientation requested by an analyzation business is not provided***);

optimal distance/orientation calculation means for employing starting point data and query point data in said database for calculating a distance between, or the orientation of each of the starting points with each of the query points (as illustrated at the RECURSIVE PROCEDURE of EXPERIMENTAL RESULTS section, the procedure employs the point as starting point and node as query point of the database for calculating the distances between starting point and query point using FOR loop and objectDIST function), ***and calculating said optimal distance or said optimal orientation for the optimization of the value of said objective function*** (if query-object distance ≥ a predefined distance, ACTIVE BRANCH LIST in the form of array as an intermediate table is generated for containing those query point and nodes, based on the generated ACTIVE BRANCH LIST, nearestNeighborSearch is called recursively to calculate an optimal distance between point and newNode to optimize the query of five nearest points).

Roussopoulos does not explicitly teach ***display means for displaying, on the screen of a geographical information system, said optimal distance or said optimal orientation calculated by said optimal distance/orientation calculation means***, and ***address*** is included in spatial information.

Koperski teaches ***display means for displaying, on the screen of a geographical information system, said optimal distance or said optimal orientation calculated by said optimal distance/orientation calculation means*** (Koperski, FIG. 3 and 4).

Frank teaches spatial information includes ***address*** (Frank, 6.2 WINDOW).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to include a display means as taught by Koperski, and address in spatial information in order to display and discover interesting knowledge from spatial data.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roussopoulos et al. [Nearest Neighbor Queries] and further in view of Koperski et al. [Spatial Data Mining: Progress and Challenges] and Frank [MAPQUERY: Data Base Query Language for Retrieval of Geometric Data and their Graphical Representation] as applied to claim 1, and further in view of Kothuri et al. [USP 6,381,605 B1].

Regarding claim 4, Roussopoulos, Koperski and Frank, in combination, teach all of the claimed subject matter as discussed above with respect to claim 1, Roussopoulos further discloses ***an intermediate table is generated based on starting point set data consisting of***

said starting point group and said objective function (Roussopoulos, EXPERIMENTAL RESULTS). Kothuri teaches a method of processing nearest neighbor queries and further discloses ***in accordance with distance values, attribute values for query points in said database are added together, based on said intermediate table*** (Kothuri, Col. 14, Lines 44-54, the sales or profit data for a related k nearest neighbor query are aggregated based on the shortest distance).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to aggregate data as taught by Kothuri in order to retrieve sale or profit data from a database.

Claims 11 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roussopoulos et al. [Nearest Neighbor Queries] in view of Koperski et al. [Spatial Data Mining: Progress and Challenges].

Regarding claims 11 and 22, Roussopoulos teaches a spatial data mining comprising the step of:

providing a set of starting points and a set of query points in a database (as illustrated by Roussopoulos at the INTRODUCTION section, an object from the database on the screen is a starting point for querying five nearest objects as query points);

designating an upper limit for a distance between said set of starting points and said set of query points (as illustrated at EXPERIMENTAL RESULTS section, the RECURSIVE

PROCEDURE used Nearest.dist as ***an upper limit for a distance between said set of starting points and said set of query points***);

calculating a distance between each starting point and each query point (as illustrated at EXPERIMENTAL RESULTS section, objectDIST is defined in the RECURSIVE PROCEDURE to calculate a distance originating at the provided object in order to optimize the query);

calculating an angle formed between a starting point and a query point whose distance from said starting point does not exceed said designated upper limit the orientation (as disclosed by Roussopoulos, the query can combine with other orientation spatial query such as "to the East of a location". East to a location implies an angle of Y_1 to Y_2 from the location. For a combined query such as "to the east of a pointed object or location, find the five nearest objects to it", an angle from Y_1 to Y_2 formed between starting point and query point must be initiated when the query is processed).

generating a data table using said angle formed with said starting point (as illustrated at the RECURSIVE PROCEDURE of EXPERIMENTAL RESULTS section, the procedure calculating the distances between starting point and query point using FOR loop and objectDIST function; if query-object distance ≥ a predefined distance, ACTIVE BRANCH LIST in the form of array as an intermediate table is generated for containing those query point and objects, and obviously, these objects have to be in the calculated angle).

Roussopoulos does not explicitly teach the purpose of the table is to ***introduce said spatial rules***.

Koperski teaches the technique of ***introducing spatial ruled*** by examining the result of nearest neighbor queries (Koperski, ALGORITHM FOR MULTIPLE LEVEL SPATIAL ASSOCIATION RULES).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to use the Roussopoulos query for introducing spatial rules in order to discover interesting knowledge from spatial data.

Claims 12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roussopoulos et al. [Nearest Neighbor Queries] in view of Frank [MAPQUERY: Data Base Query Language for Retrieval of Geometric Data and their Graphical Representation].

Regarding claim 12, Roussopoulos teaches a spatial data mining apparatus for calculating an optimal distance comprising:

input means for inputting of an objective function required for the optimization of a distance (as illustrated by Roussopoulos at the INTRODUCTION section, a user interface is provided for inputting a request to find the five nearest objects to it in the database as ***an objective function required for the optimization of a distance***);

intermediate table generation means for employing in said database starting point data and query point data for calculating the distances between each starting point and each query point and generating an intermediate table (as illustrated at the RECURSIVE PROCEDURE of EXPERIMENTAL RESULTS section, the procedure employs the point as starting point and node as query point of the database for calculating the distances between starting

point and query point using FOR loop and objectDIST function; if query-object distance ≥ a predefined distance, ACTIVE BRANCH LIST in the form of array as an intermediate table is generated for containing those query point and nodes); and

optimal distance calculation means for calculating a distance, based on said intermediate table generated by said intermediate table generation means, in order to optimize the value of said objective function that is entered by said input means (based on the generated ACTIVE BRANCH LIST, nearestNeighborSearch is called recursively to calculate a distance between point and newNode to optimize the query).

The missing of Roussopoulos technique is the ***address*** in spatial information, and Frank teaches spatial information includes ***address*** (Frank, 6.2 WINDOW).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to include address in spatial information for retrieving a particular spatial object.

Regarding claim 15, Roussopoulos teaches a spatial data mining apparatus for calculating an optimal distance comprising:

input means for inputting of an objective function required for the optimization of an orientation (as illustrated by Roussopoulos at the INTRODUCTION section, a user interface is provided for inputting a query request to find the five nearest objects to it in the database; the query can combine with other orientation spatial query such as "to the East of a location"; for a combined query such as "to the east of a pointed object or location, find the five nearest objects to it" indicates ***an objective function required for the optimization of an orientation***);

intermediate table generation means for employing, based on starting point data and query point data in said database, angles of 0 degrees from said starting points in a specific direction to generate an intermediate table in which the orientation of the locations of said query points are included (For a combined query such as "to the east of a pointed object or location, find the five nearest objects to it", degree scales, e.g., 0-180, obviously could be used, wherein 0 is the angle of pointed object with a specific direction, e.g. north, in stead of specifying east as the direction. As illustrated at the RECURSIVE PROCEDURE of EXPERIMENTAL RESULTS section, the procedure employs the combined query as discussed for calculating the distances between starting point and query point using FOR loop and objectDIST function. If query-object distance ≥ a predefined distance, ACTIVE BRANCH LIST in the form of array as an intermediate table is generated for containing those query point and nodes. As illustrated at NEAREST NEIGHBOR SEACH USING R-TREES, if two-dimensional space is used, a node is in the form [x_{low}, x_{high}, y_{low}, y_{high}]. Thus, ACTIVE BRANCH LIST includes nodes with the orientation of the locations); and

optimal orientation calculation means for calculating an orientation, based on said intermediate table generated by said intermediate table generation means, for optimizing the value of said objective function that is entered by said input means (based on the generated ACTIVE BRANCH LIST, nearestNeighborSearch is called recursively to calculate a distance in a specific direction between point and newNode to optimize the query of five nearest objects).

The missing missing of Roussopoulos technique is the ***address*** in spatial information, and Frank teaches spatial information includes ***address*** (Frank, 6.2 WINDOW).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to include address in spatial information for retrieving a particular spatial object.

Claims 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roussopoulos et al. [Nearest Neighbor Queries] and Frank [MAPQUERY: Data Base Query Language for Retrieval of Geometric Data and their Graphical Representation] as applied to claims 12 and 15, and further in view of Ester et al. [Clustering for Mining in Large Spatial Databases] and Kothuri et al. [USP 6,381,605 B1].

Regarding claim 13, Roussopoulos and Frank, in combination, teach all of the claimed subject matter as discussed above with respect to claim 12, Roussopoulos further discloses the step of ***employing query point data in said database to calculate distances between individual starting points and individual query points and to generate data records*** (Roussopoulos, EXPERIMENTAL RESULTS).

Roussopoulos and Frank fail to teach the step of ***preparing a Voronoi diagram by using said starting point data in said database***; ***employing said Voronoi diagram*** to calculate distance, and ***selecting an optimization function from among objective functions to be examined,***

and adding together record values, collected from said data records, that are required for optimization of each of said distances (Algorithm for Multiple Level Spatial Association Rules).

Ester teaches the technique of using voronoi diagram for spatial data mining technique and further discloses the technique of ***preparing a Voronoi diagram by using said starting point data in said database*** (Clustering for Mining in Large Spatial Databases).

Kothuri teaches the technique of processing nearest neighbor queries and further discloses the step of ***selecting an optimization function from among objective functions to be examined, and adding together record values, collected from said data records, that are required for optimization of each of said distances*** (Kothuri, Col. 14, Lines 33-54).

Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Roussopoulos and Frank apparatus by using voronoi diagram to cluster data and calculate distance and aggregating data in order to cluster data in a spatial database and retrieve sale or profit information by using nearest neighbor queries.

Regarding claim 16, Roussopoulos and Frank, in combination, teach all of the claimed subject matter as discussed above with respect to claim 15, Roussopoulos further discloses the step of ***employing query point data in said database to calculate distances between individual starting points and individual query points; calculating, based on said distances obtained, orientations of said starting points with said query points that fall within a designated distance upper limit, and storing said orientations as data records for said intermediate table*** (Roussopoulos, EXPERIMENTAL RESULTS). Koperski does not teach the step of ***preparing a Voronoi diagram by using said starting point data in said database; and employing said***

Voronoi diagram to calculate the distances, and ***selecting an optimization function from among objective functions to be examined, and collecting and adding record values, from said data records, that are required for optimization of each of said distances.***

Ester teaches the technique of using voronoi diagram for spatial data mining technique and further discloses the technique of ***preparing a Voronoi diagram by using said starting point data in said database*** (Clustering for Mining in Large Spatial Databases).

Kothuri teaches the technique of processing nearest neighbor queries and further discloses the step of ***selecting an optimization function from among objective functions to be examined, and collecting and adding record values, from said data records, that are required for optimization of each of said distances*** (Kothuri, Col. 14, Lines 33-54).

Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Roussopoulos and Frank apparatus by using voronoi diagram to cluster data and calculate distance and aggregating data in order to cluster data in a spatial database and retrieve sale or profit information by using nearest neighbor queries.

Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roussopoulos et al. [Nearest Neighbor Queries], Koperski et al. [Spatial Data Mining: Progress and Challenges], Frank [MAPQUERY: Data Base Query Language for Retrieval of Geometric Data and their Graphical Representation] as applied to claim 17, and further in view of Knorr et al. [Finding Aggregate Proximity Relationships and Commonalities in Spatial Data Mining].

Regarding claim 18, Roussopoulos, Koperski and Frank, in combination, teach all of the claimed subject matter as discussed above with respect to claim 17, but fails to disclose the step of ***using said optimal distance calculated for the display of circular areas, the centers of which are starting points***. Knorr teaches the technique of using circles and rectangles for displaying the features of spatial data. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Roussopoulos, Koperski and Frank technique by using circular areas to display the starting point in order to distinguish spatial information.

Regarding claim 19, Roussopoulos, Koperski and Frank, in combination, teach all of the claimed subject matter as discussed above with respect to claim 17, but fails to disclose the step of ***using said optimal orientation for the display of fan-shaped portions of said circular areas, the origins of said fan-shaped portions being said starting points at said centers of said circular areas***. Knorr teaches the technique of using circles and rectangles for displaying the features of spatial data. Krorr further discloses a feature can be any simple polygon. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Roussopoulos, Koperski and Frank technique by using a fan-shaped portion of circular areas to display the starting point in order to distinguish spatial information.

Allowable Subject Matter

Claim 14 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The closet available prior arts, Nearest Neighbor Queries published by Roussopoulos et al. in combined with the technique of Ester et al. (Clustering for Mining in Large Spatial Databases) also teaches a spatial data mining apparatus for calculating an optimal distance. However, Roussopoulos and Ester fail to teach or suggest the technique of ***repeating plane quarter division in accordance with the number of starting points that are entered, sorts said starting points into end plane pixels obtained by division and selects one starting point in each of said end plane pixels as a representative point for the pertinent pixel, prepares a quaternary incremental tree with pixels at individual levels being defined as intermediate nodes, scans said individual nodes of said quaternary incremental tree in the breadth-first order, beginning at the topmost level, and outputs a set of starting points that are positioned in ranks.***

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUNG Q. PHAM whose telephone number is 571-272-4040. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JOHN E. BREENE can be reached on 571-272-4107. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HUNG Q PHAM
Examiner
Art Unit 2162

May 11, 2005

SHAHID ALAM
PRIMARY EXAMINER

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